For official use

Technical Report Series

DISTRICT GROUNDWATER BROCHURE

KANYAKUMARI DISTRICT, TAMIL NADU

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Scientist - D

Government of India
Ministry of Water Resources

Central Ground Water Board

South Eastern Coastal Region
Chennai
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DISTRICT AT A GLANCE (KANYAKUMARI)

S. No.	ITEMS	STATISTICS	
1.	**GENERAL INFORMATION**		
	i. Geographical area (Sq. km)	**1671.84**	
	ii. Administrative Divisions (As on 31-3-2007) Number of Taluks Number of Blocks Number of Villages	 4 9 81	
	iii. Population (As on 2001 Censes) Total Population Male Female	 1676034 832269 843765	
	iv. Average Annual Rainfall (mm)	1448.6	
2.	**GEOMORPHOLOGY**		
	i. Major physiographic Units	(i). Western Ghats (ii). Coastal Plain.	
	ii. Major Drainages	Pazhayar, Valliyar & Tamirabarani.	
3.	**LAND USE (Sq. km) (2005-06)**		
	i. Forest area ii. Net area sown iii. Barren & Uncultivable waste	541.55 793.23 31.49	
4.	**MAJOR SOIL TYPES**	1. Red soil 2. Lateritic soil 3. Clayey soil, 4. River Alluvium & 5. Coastal Alluvium.	
5.	**AREA UNDER PRINCIPAL CROPS (Ha.) (2005-2006)**	1. Paddy -21709 (56%) 1. Coconut – 9388 (24%) 2. Banana – 5509 (14.2%) 4. Pulses – 166 (< 1 %)	
6.	**IRRIGATION BY DIFFERENT SOURCES (2005-06)**	**Number**	**Area irrigated (Ha.)**
	i. Dug wells	3349	1535
	ii. Tube wells	1303	913
	iii. Tanks	2623	13657
	iv. Canals	53	22542
	vi. Net irrigated area	27694 Ha.	
	vii. Gross irrigated area	38885 Ha.	

7.	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.2007)**		
	i. Dug wells	14	
	ii. Piezometers	8	
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Recent Alluvium, & Warkalai Sandstones, Peninsular Gneisses Charnockites, Khondalites, Granites and Pegmatites	
9.	**HYDROGEOLOGY**		
	i. Major water bearing formations	Warkalai Sandstones, Coastal sand and weathered & fractured Charnockites, Khondalites and Granites gneisses.	
	ii. Pre- monsoon depth to water level (May 2006)	2.66 – 20.06 m bgl	
	iii. Post- monsoon depth to water level (Jan. 2007)	1.19 – 14.57 m bgl	
	iv. Long term water level trend in 10 years (1998-2007) (m/yr)	**Annual**	
		Rise	**Fall**
		Min.: 0.1119 Max: 0.5744	Min.: 0.0417 Max: 0.6789
10.	**GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)**		
	i. Number of Exploratory wells ii. Number of Observation wells iii. Number of Piezometers under Hydrology Project-I	14 4 8	
	iv. Depth range (m)	36 – 200	
	v. Discharge (lps)	1.6 – 12	
	vi. Storativity (S)	$5.693 \times 10^{-3} - 1.42 \times 10^{-2}$	
	vii. Transmissivity (m^2/day)	10 – 300	
11.	**GROUND WATER QUALITY (As on MAY 2006)**		
	i. Presence of chemical constituents more than permissible limit	TH as $CaCO_3$, NO_3.	
	ii. Type of water	Ca-Cl, Ca-HCO_3 & Na-Cl	
12.	**DYNAMIC GROUND WATER RESOURCES (As on 31.03.2004) in MCM**		
	i. Annual Replenish able Ground Water Resources	260.26	
	ii. Total Annul Ground Water Draft for all purposes	42.16	
	iii. Projected demand for Domestic and Industrial Uses up to 2025	23.30	
	iv. Stage of Ground Water Development	16 %	
13.	**AWARENESS AND TRAINING ACTIVITY**		
	i. Mass Awareness Programs Organized		
	Year	2003-04	
	Place	Kalvillai	
	No. of Participants	250	
	ii. Water Management Training Organized		
	Year	2003-04	
	Place	Kalvillai	
	No. of Participants	28	

14.	**EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING**	Technical Guidance were provided as when sought
15.	**GROUND WATER CONTROL AND REGULATION**	
	i. Number of Safe Blocks	9
	ii. Number of Blocks Notified	**Nil**
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES.**	(i) The quality of formation water in Khondalites is saline and un fit for drinking purposes (ii) TH as $CaCO_3$ and NO_3 concentration are found in more than permissible limit at select places in the district

1.0. INTRODUCTION

1.1. Administrative Details

Kanyakumari district is divided into 4 taluks. The taluks are further divided into 9 blocks (Plate-I), which further divided into 81 villages.

S. No.	Taluk	Area in Hectares including Reserved Forest	No. of Villages	Block	No. of Villages
1	Thovala	36907	13	Thovala	13
2	Agastheeswaram	27739	20	Agastheeswaram	10
				Rajakkamangalam	10
3	Kalkulam	59363	25	Thiruvattar	9
				Thuckalay	8
				Kurunthancode	8
4	Vilavancode	43175	23	Munchirai	7
				Killiyur	7
				Melpuram	9
	Total	**167184**	**81**		**81**

1.2. Basin and sub-basin

The district is part of the composite east flowing river basin," Between Pazhayar and Tamirabarani" as per the Irrigation Atlas of India. Valliyar, Pazhayar, Tamirabarani, and Aralvaimozhi are the important Sub-basins / Watersheds.

1.3. Drainage

The major part of Kanyakumari district is drained by the principal rivers namely Kodayar and Paralayar and their tributaries. Kodayar River rises in the Agastiar Malai and flows in a southerly direction flowing for a length of 10 km from its origin, leading to natural drainage called the Kodayar Lake, which serves as the main source of irrigation system with an extensive command area in the district. Later, it flows in a southwesterly direction and south of Kuzhithurai and joins the Arabian Sea near Thengapatnam, which is at a distance of 56 km west of Cape Commerin. The river flows through rugged terrain through a succession of falls and cascades. One such fall lies south of Tiruparappu. Chittar-I and Chittar-II are the major tributaries of Kodayar.

Tamirabarani, which is one of the important rivers of the district, which is flowing in the central part of the district and drain in the Melpuram, Kuzhithurai, Munchirai and Killiyur blocks. The river falls into Indian Ocean after traversing Killiyur block.

The Pazhayar River originated at an altitude of 1300 m amsl in the Mahendragiri hills and the river water taken away through channels for irrigation. The river is benefited

by both SW-NE monsoons. It completes its 20 km journey after joining the Arabian Sea. Its creek can be seen near Manakudi, 12 km south of Nagarcoil.

The river Valliyar originated at an altitude of 950 m MSL at the Vallimalai Hills and has a very limited irrigation system. The length of the river is nearly 29 km, and period of flow of water in this river is for 6 months. Near Manavalakurichi the river joins in the Arabian Sea.

1.4. Irrigation Practices

The nine-fold lands use classification for the district is given below. (2005-06)

S. No.	Classification	Area (Ha)
1	Forests	54155
2	Barren & Uncultivable Lands	3149
3	Land put to non agricultural uses	26890
4	Cultivable Waste	0
5	Permanent Pastures & other grazing lands	133
6	Groves not included in the area sown	581
7	Current Fallows	1433
8	Other Fallow Lands	1536
9	Net Area sown	79323
	Total	**167200**

(Source: Department of Economics & Statistics, Govt. of Tamil Nadu)

The chief irrigation sources in the area are the Canals, tanks, wells and tube/bore wells and other sources. Irrigation is higher in Agastheeswaram, Thovala and Rajakkamangalam blocks followed by Thuckalay, Kurunthancode, Killiyur, Melpuram, and Munchirai blocks. The block-wise and source-wise net area irrigated (Ha) (2005-06) is given below.

S. No.	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube/ Bore wells	Ordinary wells	Other Sources	
1	Thovala	4685	260	28	59	18	5050
2	Agastheeswaram	5215	449	0	315	0	5979
3	Rajakkamangalam	2335	638	494	577	0	4044
4	Thiruvattar	588	1112	0	12	94	1806
5	Thuckalay	1021	2529	0	19	3	3572
6	Kurunthancode	813	2199	0	185	4	3201
7	Munchirai	254	554	0	31	12	851
8	Killiyur	667	1058	0	35	52	1812
9	Melpuram	335	983	0	6	55	1379
	Total	**15913**	**9782**	**522**	**1239**	**238**	**27694**

(Source: Department of Economics & Statistics, Govt. of Tamil Nadu)

1.5. Studies /Activities carried out by CGWB

Central Ground Water Board has carried out hydrological surveys in the district during 1985-86. Besides these a few water supply investigations were also carried out by CGWB for the Central Government Organisations.

Ground water exploration has been carried out by CGWB in the district during the year 1993 and 1994 to assess the capabilities of aquifers, water quality of individual aquifers and ground water worthiness of the district. In all, fourteen exploratory wells and four observation wells with depths ranging from 36 to 200 m bgl were drilled in the district.

Fourteen dug wells and 8 peizometers are monitored in entire Kanyakumari district to study the long-term water level fluctuation and take appropriate remedial measures in over-exploited and critical areas for sustainable ground water developments.

2.0. RAINFALL AND CLIMATE

The Kanyakumari district received the rain under the influence of both southwest and northwest monsoons. The southwest monsoon chiefly contributes to the rainfall in the district. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal. The normal annual rainfall over the district varies from about 826 to 1456 mm. It is the minimum around Kanyakumari in the southeastern part of the district. It gradually increases towards west, north and northwest and attains a maximum around Thackalay.

The highest humidity is generally recorded in May with the value of 95 percent whereas the minimum of 45 percent is recorded during February.

The maximum wind speed of 17.74 km/hr is recorded during August and the minimum wind speed of 5.53 km/hr is recorded during December. Wind velocity is low from October to December.

The Sun Shine Hours is March-April forms the average bright sunshine hours. The maximum of 12.74 hrs/day has been recorded during April and the minimum of 5.74 hrs/day is recorded during November. The temperature data indicate higher and lower temperatures prevailed during monsoon period. The average maximum temperature during May is 35.93^{o} C. The average minimum temperature recorded is 23.85^{o} C during January. The annual mean minimum and maximum temperatures are 23.78 and 33.95^{o} C respectively.

3.0. GEOMORPHYLOGY AND SOIL TYPES

3.1. Geomorphology

Kanyakumari district is bordered by Western Ghats (Ridge and valley complex) in the West. Western Ghats form an elevation of 200 m amsl from these foothills in the west. The areas gently slope to southeast towards the Gulf of Mannar attaining an elevation of 25 to 30 m amsl. The eastern and central tracts are quite barren, but there are a few isolated knife edged hillocks. The coastal tracts are occupied by the marshy swamps and number of sand dunes (Teri sands).

The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Structural Hills 2) Bazada 3) Valley Fill, 4) Flood Plain 5) Pediment, 6) Shallow Buried Pediments, 7) Deep Buried Pediments, and 8) Coastal Plain.

3.2. Soils

The soils of Kanyakumari district can be classified into i) Red Soil, ii) Red lateritic soil, (iii) Brown soil and iv) Coastal sand. The soils are mostly in-situ in nature, lateritic, earthy and pale reddish in colour. They are derived from laterisation of gneisses. The soils derived from gneisses are mostly brownish. The thickness of soils in the mounts is almost negligible whereas in the valleys it is around 2 m.

The lateritic type of soil occurs in Thiruvattar, Munchirai, Kurunthancode, Rajakkamangalam, Killiyur, Thuckalay and Melpuram blocks. The mixed type of Red and alluvial soils, occur in Agastheeswaram and Thovala blocks. The coastal sand occurs in the western side of the district. The coastal alluvium sand is of high fertility.

4.0. GROUND WATER SCENARIO

4.1. Hydrology

The district is underlain by both porous and fissured formations (Plate-II). The important aquifer systems in the district are constituted by i) unconsolidated & semi-consolidated formations and (ii) weathered, fissured and fractured crystalline rocks.

In the areas underlain by crystalline rocks, occurrence of ground water is essentially limited to zone of weathering and fracturing. Generally the hard rock aquifers are heterogeneous in nature, which is indicated by the variations in lithology, structure and texture. Ground water occurs under phreatic condition in the weathered mantle and semi-confined to confined conditions in the fracture and fissured zones of these rocks. Thickness of weathered material varied widely from less than a meter to more than 20 m. The depths to water levels in these formations vary from 8 to 18 m bgl. The depth of dug wells tapping crystallines ranging from 10 to 20 m bgl.

The unconsolidated formations in the East coast are exposed as patches between

Kudankulam, Idinjakara and Vijayapathi areas over a stretch of about 10 km. The thickness of the formation is about 10 to 30 meters and the depth of the formation increases towards the sea. The depth to water level ranges from 8 to 18 m bgl.

The Alluvium with intervening crystalline outcrops are noticed as patches west of Kanyakumari, Pazhathottam Kalluvilai and Lipuram areas. The ground water occurs under water table to semi-confined conditions. The depth to water level ranges from 6 to 10 m bgl and the discharge ranges from 10 to 20 m^3/day.

The sand dunes occurring between Vayakkallur, bordering Tamirabarani River, and Marthandamthuri for about 10 km. Stretch is well protected by the Parvathi Puttanar canal from Sea Water intrusion. Hence, the sand dunes are more potential in the up stream side of the Parvathi, Puttanar canal, especially in the Samathuvapuram colony area. In this area, there are number of schemes maintained by TWAD Board, covering the following villages Puturai, Tututurai, Irayammantura, Iraviputtanturai and Vallimalai.

In the sand dunes ground water occurs under phreatic condition. The depth to water level ranges from 4 to 8 m bgl and the discharge ranges from 30 to 80 m^3/day.

The yield of large diameter wells in the district, tapping the weathered mantle of crystalline rocks ranges from 150-200 m^3/day and are able to sustain pumping for 2 to 4 hours per day. The yield of large diameter wells tested in crystalline rocks ranges from 150 to 200 m^3/day for drawdown of 1 to 3 m. The yield characteristics of wells vary considerably depending on the topographic set-up, litho logy and nature of weathering. The transmissivity of weathered formations computed from pumping test data using empirical methods ranges from 12 to 22 m^2/day. The specific capacity in the fissured formation ranges from 2.89 to 153.74 lpm/m/dd. In the porous formation the specific capacity values vary from 6.31 to 28.7 lpm/m/dd.

The yield of bore wells drilled down to a depth of 36 to 200 m bgl, by various state agencies mainly for domestic purposes. The discharge ranged from 2.05 to 33.13 lps. The yield of successful bore wells drilled down to a depth of 200 m bgl during the ground water exploration programme of Central Ground Water Board ranged from 1 to 12 lps. The aquifer and well parameters of the wells show wide variation, both in crystalline and sedimentary formations.

The depth to water level in the district varied between 5.27 and 16.70 m bgl during pre-monsoon (Plate-III) and varied between 2.47 and 11.32 m bgl during post monsoon (Plate-IV). The seasonal fluctuation shows a rise in water level, which ranges from 3.71 to 7.06 m bgl. The piezometric head varied between 2.66 to 20.06 m bgl during pre monsoon (May 2006) and 1.19 to 14.57 m bgl during post monsoon (January 2007).

4.1.1. Long Term Fluctuation (1998-2007)

The long-term water level fluctuation for the period 1998-2007 indicates rise in water level in the area at the rate of 0.0225 to 0.5744 m/year. The fall in water level is ranging between 0.0600 and 0.6789 m/year.

4.1.2. Aquifer Parameters

The Transmissivity values in weathered, partly weathered and jointed rocks vary from 12 to 300 m^2/day and specific yield in these formations is less than 2% and the Transmissivity values ranged from 4 to 16 m^2/day. The specific yield in various formations is around 2 to 4%.

4.2. Ground Water Resources

The ground water resources have been computed jointly by Central Ground Water Board and State Ground and Surface Water Resources and Data Center (PWD, WRO, Government of Tamil Nadu) as on 31st March 2004. The salient features of the computations are furnished below. The computation of ground water resources available in the district has been done using GEC 1997 methodology.

Block	Net Ground water Availability (M. Cum.)	Existing Gross Draft for Irrigation (M. Cum.)	Existing Gross Draft for Domestic and industrial water supply (M. Cum.)	Existing Gross Draft for all uses (M. Cum.)	Allocation for Domestic and Industrial Requirement supply up to next 25 years (2029) (M. Cum.)	Net groundwater Availability for future Irrigation Development (M. Cum.)	Stage of Ground Water Development (%)	Categor y of Block
Agastheeswaram	40.84	3.65	2.43	6.09	2.52	34.66	15	Safe
Killiyur	16.58	0.31	3.14	3.45	3.25	13.02	21	Safe
Kurunthancode	31.31	2.54	3.06	5.60	3.17	25.61	18	Safe
Melpuram	22.15	0.97	2.21	3.18	2.29	18.89	14	Safe
Munchirai	13.71	0.32	3.27	3.58	3.38	10.01	26	Safe
Rajakkamangalam	29.60	8.78	2.37	11.16	2.45	18.37	38	Safe
Thiruvattar	20.39	0.33	1.56	1.89	1.62	18.44	9	Safe
Thovala	51.65	2.46	0.96	3.43	1.00	48.19	7	Safe
Thuckalay	34.04	0.30	3.50	3.80	3.62	30.12	11	Safe
Total	**260.26**	**19.66**	**22.51**	**42.17**	**23.30**	**217.31**	**16**	

4.3. Ground Water Quality

The chemical characteristics of ground water in the phreatic zone in Kanyakumari district has been studied using the analytical data of ground water samples collected from Network Hydrograph Stations of Central Ground Water Board. The study of quality of ground water in deeper aquifers in the district has been attempted using the data collected from exploratory bore/tube wells constructed in the district.

Ground water in phreatic aquifers in Kanyakumari district, in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in Micro Seimens at 25^{o} C) during May 2006 was in the range of 150 to 2240 in the district. It is between 750 and 2250 µS/cm at 25^{o} C in the major part of the district. Conductance below 750 µS/cm has been observed in ground water in parts of Marthandam, Attur, Villukuri and Chettiyarmadam.

It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and Nitrate in more than 90 percent of samples analysed. Total Hardness as $CaCO_3$ is observed in all samples have with in the permissible limits analysed whereas Nitrate is found in excess of 45 mg/l in about 25 percent samples. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas the Nitrate pollution is most likely due to the use of pesticides and fertilizers for agriculture.

With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ratio (SAR), it is observed that ground water in the phreatic zone may cause high to very high salinity hazard and medium to high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while suing ground water for irrigation.

4.4. Status of Ground Water Development

The estimation of groundwater resources for the district has shown that all block is under “Safe” category (Plate-V).

The shallow alluvial aquifers along Tamirabarani and Valliyar rivers serve as an important source of drinking water irrigation development for Kanyakumari district. Dug wells are the most common ground water abstraction structures used for irrigation in the district. The yield of dug wells ranges from 150 to 200 m^3/day in weathered crystalline rocks, 20 to 100 m^3/day in unconsolidated formations and up to 200 m^3/day in recent alluvial formations along major drainage courses.

5.0. Groundwater Management Strategy

5.1 Groundwater Development

The yields of dug wells in crystalline and unconsolidated formations are improved at favorable locations by construction of extension bores, which are 20 to 40 m. Deep. In recent years, farmers for irrigation purposes have also drilled a large number of bore wells.

The development of ground water for irrigation in the district is mainly through dug wells tapping the weathered residuum or recent alluvial deposits. Bore wells have also become popular as the source for irrigation in the district in recent years. Dug wells with extension bores wherever necessary is ideal for hard rock areas. Whereas large diameter dug wells with radials are suitable for alluvial areas.

Large diameter collector wells are ideal structures for ground water extraction in the river alluvial tracts, where the granular zones are generally restricted to 35 m bgl. The coastal sands in the eastern part of the district also form good aquifer material. The tube wells may be constructed down to a maximum depth of 40 m bgl in the district. The width and position of the screen in the wells may be decided based on the depth to piezometric surface and discharge required. The expected discharges corresponding to the screen lengths are given below for reference.

Hydraulic Conductivity (m/d)	Screen Length (m)	Discharge (m^3/hr)
20	6	17
30	6	30
40	6	35
30	9	45
40	9	50

The map showing the development prospects for the district is shown in Plate-VI.

5.2. Water Conservation and Artificial Recharge

The topography of Kanyakumari district, in general, is suited for construction of various artificial recharge structures such as percolation ponds, check dams and sub-surface dykes. However, detailed studies are necessary to formulate a comprehensive scheme for artificial recharge of phreatic ground water in the district in view of the variations in the geomorphic set-up and the complex hydrological and hydrogeological conditions. Central Ground Water Board is also providing free technical guidance for implementation of rooftop rainwater harvesting schemes, and manual is also published to give more scientific design tips.

6.0. Groundwater related Issues and Problems

TH as $CaCO_3$ and Nitrate concentration are found more than permissible limit at select places. The district is on the coast and there is a steady influx of tourist and due to which there may be a prominently local groundwater extraction, which may result in local decline water levels in pockets along the coast.

Awareness and Training Activity

7.1. Mass Awareness Campaign (MAP) and Water Management Training Programme (WMTP) by CGWB

One MAP and One WMTP were organized" at Vivekananda Kendra, Kalvillai, Kanyakumari, Kanyakumari district during the year 2003-04.

7.2. Area Notified by CGWA/SGWA

Central Ground Water Authority and State Government of Tamil Nadu have not notified any area in the district.

8.0. RECOMMENDATIONS

The occurrence and movement of ground water in the hard rock is limited to weathered, jointed, fractured and sheared zones. In Alluvial and Tertiary formation, ground water occurs under phereatic and confined conditions. Thickness and aerial extent of formations is very limited. In the bore wells tapping deep fracture zone of Khondolite formation in certain pockets is brackish in nature.

The wells tapping coastal Alluvium/Tertiary aquifers, the heavy withdrawal creates an imbalance in the aquifer system and may leads to salt water intrusion in the flesh water pocket in peak summer if not regulated.

PLATE - I

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

KANYAKUMARI DISTRICT, TAMIL NADU

LOCATION

(NOT TO SCALE)

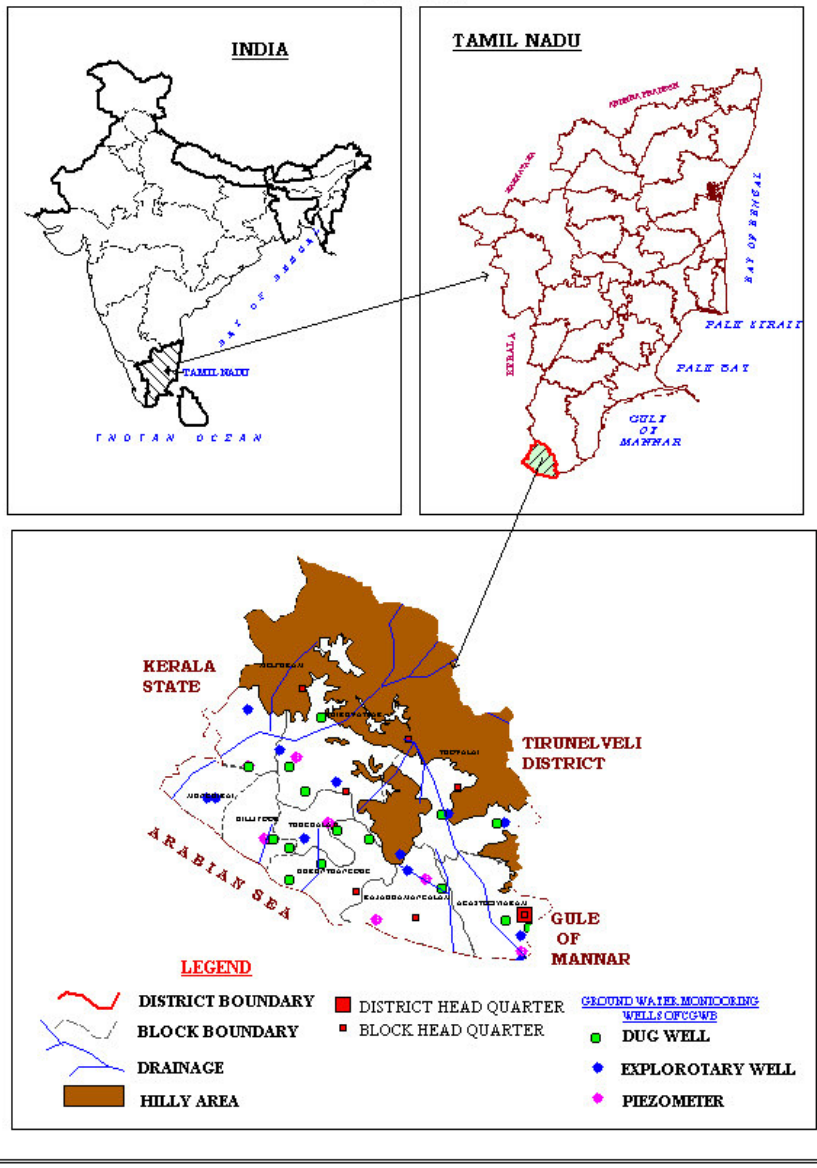
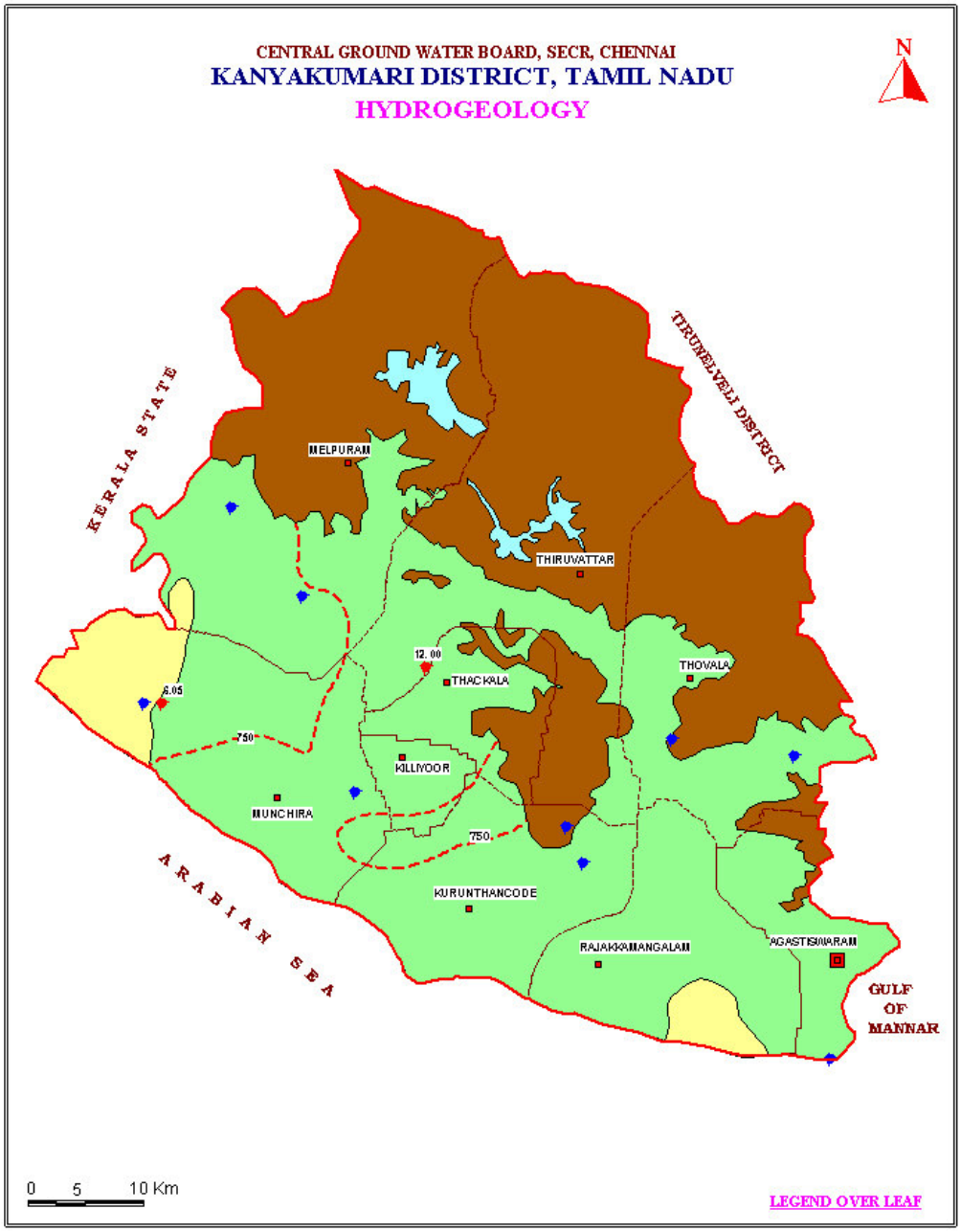


PLATE - II


CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KANYAKUMARI DISTRICT, TAMIL NADU
HYDROGEOLOGY
N
KERALA STATE
TIRUNELVELLI DISTRICT
MELPURAM
THIRUVATTAR
12.00
THACKALA
6.05
750
KILLIYOOR
THOVALA
MUNCHIRA
750
KURUNTHANCODE
RAJAKKAMANGALAM
AGASTISWARAM
ARABIAN SEA
GULF OF MANNAR
0 5 10 Km
LEGEND OVER LEAF

LEGEND FOR PLATE- II

ADMINISTRATIVE SETUP

- DISTRICT BOUNDARY
- BLOCK BOUNDARY
- DISTRICT HEAD QUARTER
- BLOCK HEAD QUARTER
- HILLY AREA
- RESERVOIR

GROUND WATER HYDROLOGY

- EXPLORATORY BORE WELL [CGWB]
- HIGH YIELDING BORE WELL [CGWB]

HYDROCHEMISTRY

750 — ISOCONS [Sp ELECTRICAL CONDUCTANCE [µS /Cm at 25° C]

AQUIFER	AGE	LITHOLOGY	GROUND WATER CONDITIONS	YIELD PROSPECTS (Cum /day)	GROUND WATER DEVELOPMENT STRATEGIES
UNCONSOLIDATED	RECENT	RIVER ALLUVIUM,	THIN UNCONFINED AQUIFERS	20-100	DEVELOPMENT THROUGH LARGE DIAMETER DUG WELLS
CONSOLIDATED	ARCHAEAN	GRANITE, GNEISSES, CHARNOCKITE	DISCONTINUOUS, UNCONFINED TO SEMI-CONFINED AQUIFERS, RESTRICTED TO WEATHERED RESIDUUM AND FRACTURES	150-200	SUITABLE FOR DEVELOPMENT THROUGH DUG WELLS. BOREWELLS FEASIBLE IN FRACTURE ZONES, BEST LOCATIONS BEING INTERSECTION OF FRACTURES

PLATE-III

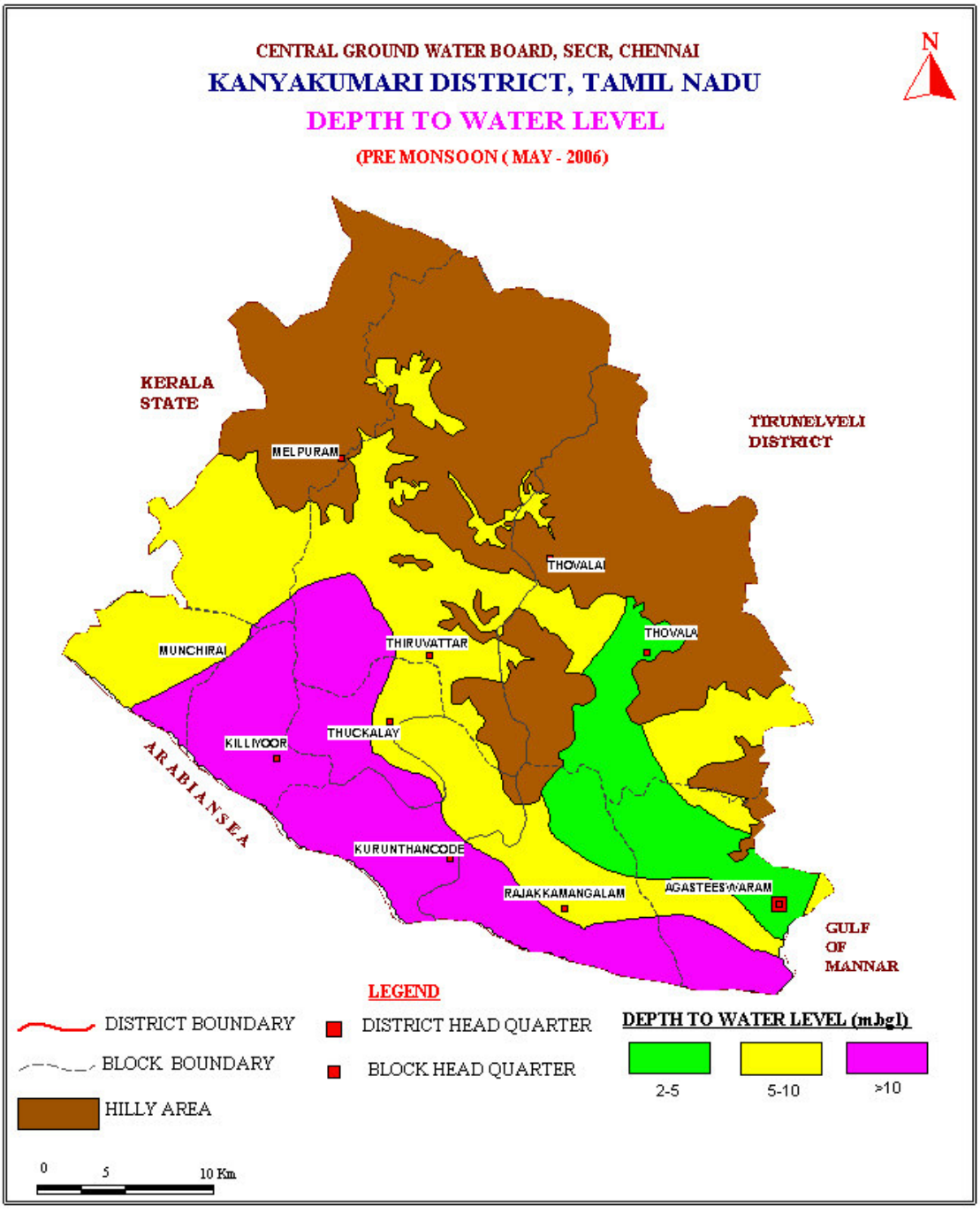

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KANYAKUMARI DISTRICT, TAMIL NADU
DEPTH TO WATER LEVEL
(PRE MONSOON (MAY - 2006)
N
KERALA STATE
TIRUNELVELI DISTRICT
MELPURAM
THOVALAI
THOVALA
MUNCHIRAI
THIRUVATTAR
THUCKALAY
KILLIYOOR
ARABIAN SEA
KURUNTHANCODE
RAJAKKAMANGALAM
AGASTEESWARAM
GULF OF MANNAR
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
HILLY AREA
DISTRICT HEAD QUARTER
BLOCK HEAD QUARTER
DEPTH TO WATER LEVEL (mbgl)
2-5
5-10
>10
0
5
10 Km

PLATE-IV

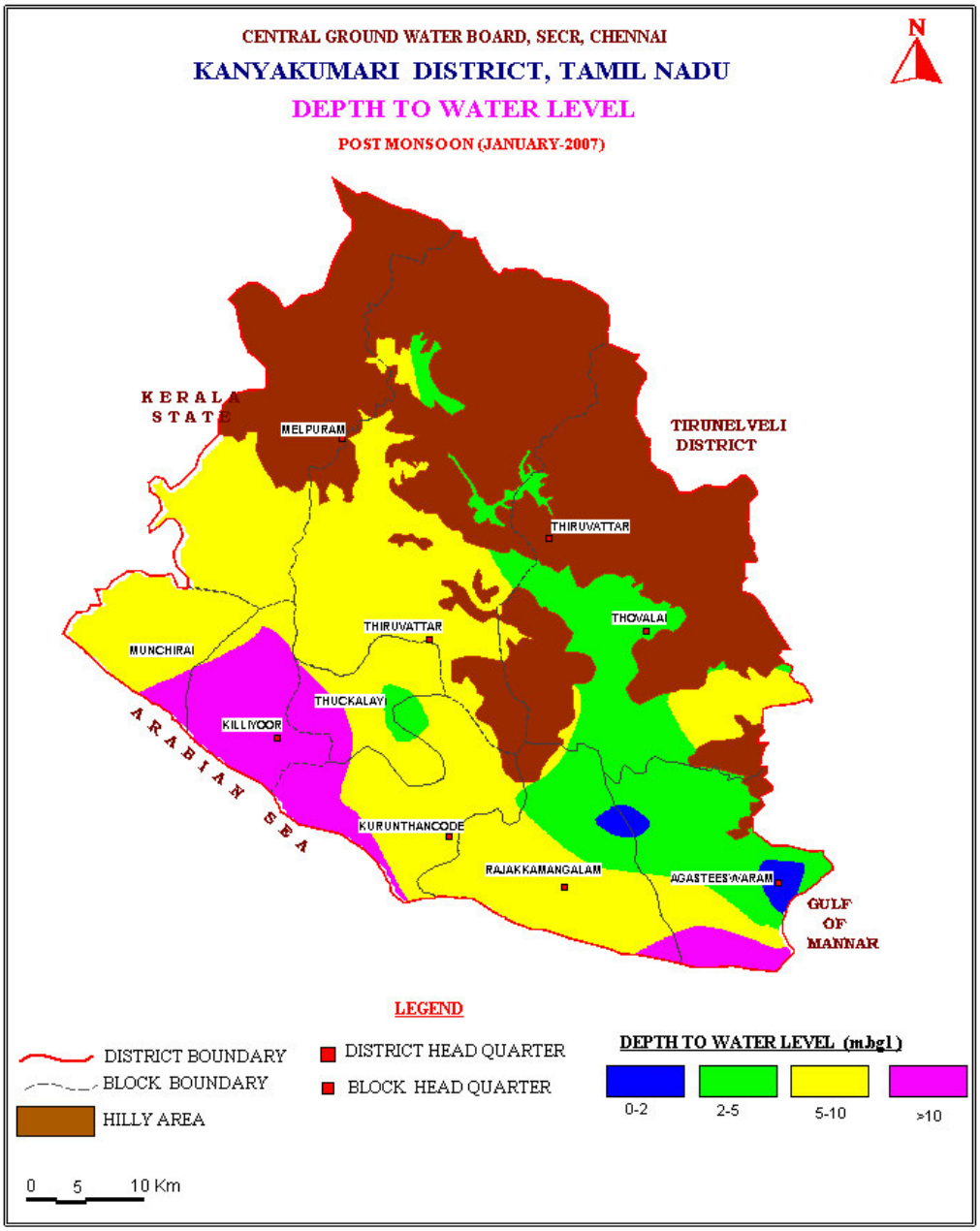

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KANYAKUMARI DISTRICT, TAMIL NADU
DEPTH TO WATER LEVEL
POST MONSOON (JANUARY-2007)
N
KERALA STATE
MELPURAM
TIRUNELVELI DISTRICT
THIRUVATTAR
THOVALAI
THIRUVATTAR
MUNCHIRAI
THUCKALAY
KILLIYOOR
ARABIAN SEA
KURUNTHANCODE
RAJAKKAMANGALAM
AGASTEESWARAM
GULF OF MANNAR
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
HILLY AREA
DISTRICT HEAD QUARTER
BLOCK HEAD QUARTER
DEPTH TO WATER LEVEL (mbgl)
0-2
2-5
5-10
>10
0 5 10 Km

PLATE - V

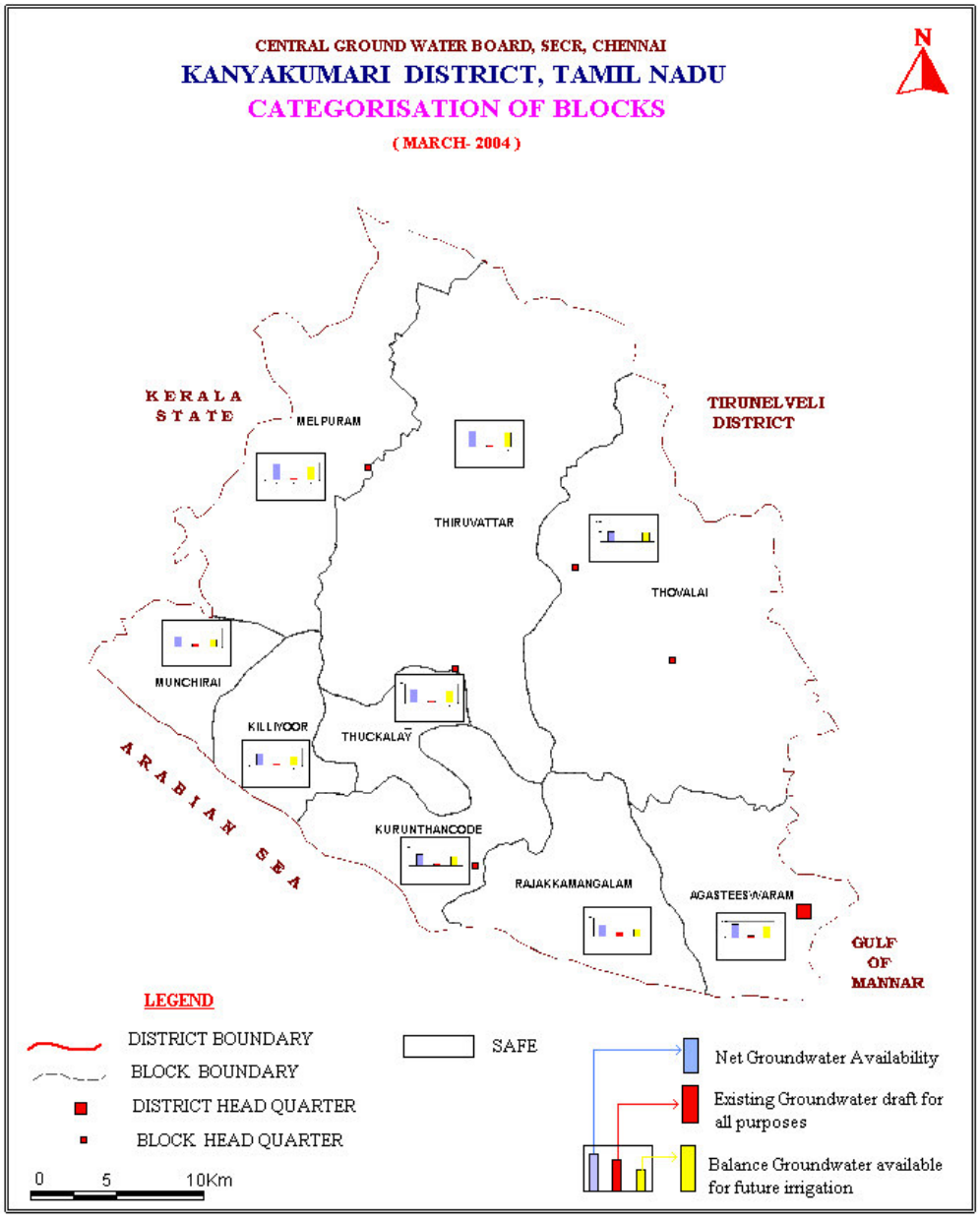
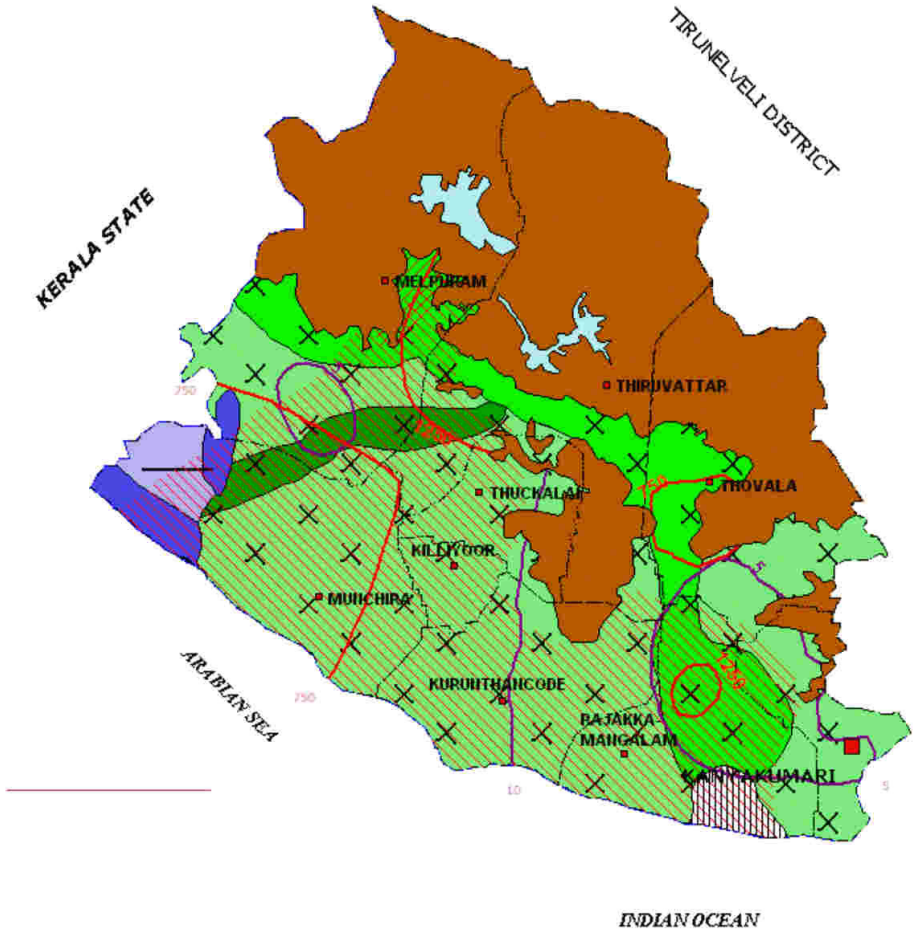

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KANYAKUMARI DISTRICT, TAMIL NADU
CATEGORISATION OF BLOCKS
(MARCH- 2004)
N
KERALA STATE
TIRUNELVELI DISTRICT
MELPURAM
THIRUVATTAR
THOVALAI
MUNCHIRAI
KILLIYOOR
THUCKALAY
KURUNTHANCODE
RAJAKKAMANGALAM
AGASTEESWARAM
ARABIAN SEA
GULF OF MANNAR
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
DISTRICT HEAD QUARTER
BLOCK HEAD QUARTER
SAFE
Net Groundwater Availability
Existing Groundwater draft for all purposes
Balance Groundwater available for future irrigation
0 5 10Km

PLATE- VI

CENTRAL GROUND WATER BOARD, SECR, CHENNAI.

GROUND WATER DEVELOPMENT POTENTIAL AND ARTIFICAL RECHARGE PROSPECTS

KANYAKUMARI DISTRICT, TAMIL NADU



LEGEND OVER LEAF

LEGEND FOR PLATE -VI

DISTRICT – KANYAKUMARI

	Wells Feasible	Rigs Suitable	Depth of Well (M)	Discharge (LPM)	Suitable Artificial Recharge Structures
Soft Rock aquifer	Dug Well	Manual	10 - 15	60 – 120	Percolation Ponds
Soft Rock aquifer	Dug Well	Manual	10 - 15	100 – 200	Percolation Ponds
Hard Rock aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	15 50 + 50–60 100-150	10 - 60	Check Dams Across River At Foothills & Percolation Ponds In Plains
Hard Rock aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	10-20 15 – 20 +50 – 60 100 - 150	60 - 120 60 - 120 10 - 60	Check Dams Across River At Foothills & Percolation Ponds In Plains
Hard Rock aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	10 – 20 15 – 20 +50 – 60 100 - 150	50 – 180	Percolation Ponds
	State Boundary			District Boundary	
	Hilly Area			Block Boundary	
	District Headquarter			Block Headquarter	
5	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) Mbgl		1250	EC In Micro siemens / Cm at 25° C	
	River			Lineament	
	Fluoride Greater than maximum Permissible Limit (1.5 mg/l)			Nitrate Greater than maximum Permissible Limit (45 mg/l)	
	Reservoir			Saline Zone	

OTHER INFORMATION

Geographical Area	1684 Sq.Km.
No. of Blocks	9
Major Drainage	Kodayar & Paralayar.
Population (2001)	16,69,763
Average Annual Rainfall	1423 Mm
Annual Range of Temperature	25 – 32° C
Regional Geology	**Soft Rocks:** Sandstone, sand and clay **Hard Rocks:** Charnockites Khondalites, Granite, Gn eiss.
Net Ground Water Availability for Future Irrigation	217.31 MCM/Yr
Stage of Ground Water Development (As on March 2004)	16 %
Name of Blocks Showing Intensive Ground Water Development	Nil

SAVE WATER

AND

CONSERVE WATER

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